



# Sustainable Terminals Accelerating Regional Transformation (START) Project Phase 1

The START Project is a pioneering demonstration of a multi-region, zero- and near-zero-emission supply chain in advancement of the California Sustainable Freight Action Plan. Funded by the Zero- and Near-Zero-Emission Freight Facilities Grant, the Project will demonstrate what sustainable supply chains of the future can look like: containers delivered by the world’s cleanest vessels, loaded onto zero-emission yard tractors, handled by zero-emission top handlers and rubber-tired gantry (RTG) cranes, transferred to zero-emission trucks headed for an off-dock cargo-handling facility.



The START Project will demonstrate 102 pieces of zero-emissions terminal equipment and trucks at three California seaports, develop a near-zero-emissions tugboat, deploy two American-flagged Jones Act container vessels with some of the cleanest available engines, and advance workforce development programs to support sustainable goods movement across California. The START Project is anticipated to reduce annual emissions by 12,821.7MT CO<sub>2</sub>e, 25.796 tons NO<sub>x</sub>, 1.052 tons ROG, and 0.2682 tons diesel PM<sub>10</sub>.

**Dates:** 01/23/2019 – Summer 2021  
**Grantee:** Port of Long Beach  
**Partners:** SSA Terminals, Shippers Transport Express, Matson Navigation Lines, Harley Marine, Port of Oakland, Port of Stockton, South Coast AQMD, Southern California Edison, Tetra Tech, and Grant Farm.

**Grant Amount:**  
 CARB Contribution: \$50,000,000  
 Matching Funds: \$52,998,742  
 Project Total: \$102,998,742

## Vehicles/Equipment Funded

Port of Long Beach

- 33 DINA and TransPower Battery-Electric Yard Tractors
- 1 Taylor and BYD Battery-Electric Top Handler
- 9 ZPMC and Cavotec Battery-Electric Rubber-Tired Gantry (RTG) Cranes
- 5 Peterbilt and TransPower 500-hp Battery-Electric Class 8 Drayage Trucks

Port of Oakland

- 5 DINA and TransPower Battery-Electric Yard Tractors
- 1 Taylor and BYD Battery-Electric Top Handler
- 10 Peterbilt and TransPower 400-hp Battery-Electric Class 8 Drayage Trucks

Port of Stockton

- 18 Wiggins and Thor 36,000-lb Battery-Electric Forklifts
- 16 Wiggins 8,000-lb Battery-Electric Forklifts
- 1 NordCo Battery-Electric Rail Car Mover



Harbor Craft and Ocean-Going Vessels

- 2 Tier 3 Low-NOX Jones Act Container Ships
- 1 Tier 4 Electric Drive Tug Boat

## Lessons Learned

- Interest in sustainable goods movement and supply chains is growing rapidly among shippers, carriers, and operators.
- Fueling and charging infrastructure costs are always higher than anticipated, particularly in the constrained port environment.
- Electrifying a heavy-duty fleet requires innovative charging solutions, which must be designed in concert with the equipment.

## Status Updates

- The START Project Kick-Off Meeting with the California Air Resources Board was held on January 23, 2019.
- Purchase orders have been submitted for the battery-electric forklifts to be deployed in the Port of Stockton.
- Procurement and bidding is underway for the design and engineering of charging stations at the Port of Oakland.

